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GGSIPU mathmatics 2012

1. If the lines x-y-1=0, 4x+3y=k and 2x-3y+1=0 are concurrent, then k is

 (a) 1 (b) -1

 (c) 25 (d) 5

2. the number of common tangents to the circles $x^2+y^2 = 4$ and $x^2+y^2-8x+12 = 0$ is

 (a) 1 (b) 2 (c) 3 (d) 4

3. The centroid of a triangle formed by the points (0,0), (cos ¯,sin ¯) and (sin ¯, - cos ¯) lie on the line y = 2x; then ¯ is

 (a) $\tan^{-1} 2$ (b) $\tan^{-1}\frac{1}{3}$

 (c) $\tan^{-1}\frac{1}{2}$ (d) $\tan^{-1}(-3)$

4. The orthoocentre of the triangle formed by (8,0) and (4,6) with the origin, is

 (a) $(4,\frac{8}{3})$ (b) (3,-4)

 (b) (4,3) (d) (3,4)

5. If the angle between two lines represented by $2x^2+5xy+3y^2+7y+4 = 0$ is $\tan^{-1} m$, then m is equal to

 (a) $\frac{1}{5}$ (b) 1

 (c) $\frac{7}{5}$ (d) 7

6. If $xy-4x+3y-^a = 0$ represents the asymptotes of xy-4x+3y = 0, then ^{a} is

 (a) 3 (b) -6 (c) 8 (d) 12

7. The equation of the chord of the parabola $y^2 = 8x$ which is bisected at the point (2,-3), is

 (a) 4x+3y+1 = 0

 (b) 3x+4y-1 = 0

 (c) 4x-3y-1 = 0

 (d) 3x-4y+1 =0

8. If x+y+1 = 0 touches the parabola $y^2 = {}^a x$, then ^{a} is equal to

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(a) 2 (b) 4 (c) 6 (d) 8

9. The equations $x = \frac{e^t + e^{-t}}{2}$, $y = \frac{e^t - e^{-t}}{2}$ where t is real number, represents

(a) an ellipse (b) a parabola

(c) a hyperbola (d) a circle

10. if e_1 and e_2 are the eccentricities of two conics with $e_1^2 + e_2^2 = 3$, then the conics are

(a) ellipses (b) parabolas

(c) circles (d) hyperbolas

11. The sum of the distances of any point on the ellipse $3x^2+4y^2 = 24$ from its foci, is

(a) $8\sqrt{2}$ (b) 8

(c) $16\sqrt{2}$ (d) $4\sqrt{2}$

12. In aABC, if a tends to 2c and b tends to 3 c, then cos B tends to

(a) -1 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$

13. if sin (® cos ¯) = cos (® sin ¯), then which of the following is correct

(a) $\cos\theta = \frac{3}{2\sqrt{2}}$

(b) $\cos\left(\theta - \frac{\pi}{2}\right) = \frac{1}{2\sqrt{2}}$

(c) $\cos\left(\theta - \frac{\pi}{4}\right) = \frac{1}{2\sqrt{2}}$

(d) $\cos\left(\theta + \frac{\pi}{4}\right) = -\frac{1}{2\sqrt{2}}$

14. The value of $\sin 12^0 \sin 48^0 \sin 54^0$ is equal to

(a) $\frac{2}{3}$ (b) $\frac{1}{2}$

(c) $\frac{1}{8}$ (d) $\frac{1}{3}$

15. If $3\sin^{-1}\left(\frac{2x}{1+x^2}\right) - 4\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right) + 2\tan^{-1}\left(\frac{2x}{1-x^2}\right) = \frac{\pi}{3}$, then x is equal to

(a) $\frac{1}{\sqrt{3}}$ (b) $-\frac{1}{\sqrt{3}}$

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(c) $\sqrt{3}$ (d) $-\frac{\sqrt{3}}{2}$

16. The shadow of a pole is $\sqrt{3}$ times longer. The angle of elevation is equal to

(a) 40^0 (b) $\frac{45^0}{2}$

(c) 60^0 (d) 30^0

17. The point of contact of the line x-y+2=0 with the parabola y^2-8x = 0 is

(a) (2,4) (b) (-2,4)

(c) (2,-4) (d) (2,2)

18. If the sides of a triangle are x^2 +x+1, x^2-1 and 2x+1, then the greatest angle is

(a) 90^0 (b) 135^0 (c) 115^0 (d) 120^0

19. The value of cos 1^0. Cos 2^0. cos 3^0... cos 179^0 is equal to

(a) $\frac{1}{\sqrt{2}}$ (b) 0

(c) 1 (d) -1

20. If cot (~+) = 0, then sin (~+2) is equal to

(a) sin ~ (b) cos ~

(c) sin (d) cos 2

21. The value of 4 sin A $\cos^3$ A – 4 cos A $\sin^3$ A is equal to

(a) cos 2A (b) sin 3A

(c) sin 2A (d) sin 4A

22. If the solutions for ¯ of cos of cos p¯+cos q¯ = 0, 0>q>0 arer in AP, then the numerically smallest common difference of AP is

(a) $\frac{\pi}{p+q}$ (b) $\frac{2\pi}{p+q}$

(c) $\frac{\pi}{2(p+q)}$ (d) $\frac{1}{p+q}$

23. The value of k for which $(\cos x + \sin x)^2$+ k sin x cos x -1 = 0 is that identity, is

(a) -1 (b) -2 (c) 0 (d) 1

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24. If $4\cos^{-1}x + \sin^{-1}x = ®$, then the value of x is

(a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$

(c) $\frac{\sqrt{3}}{2}$ (d) $\frac{2}{\sqrt{3}}$

25. a problem in mathematics is given to 3 students whose chances of solving individually are $\frac{1}{2}, \frac{1}{3}$ and $\frac{1}{4}$. The probability that the problem will be solved at least by one, is

(a) $\frac{1}{4}$ (b) $\frac{1}{24}$

(c) $\frac{23}{24}$ (d) $\frac{3}{4}$

26. In a non-leap year the probability of getting 53 Sundays or 53 Tuesdays or 53 Thursdays is

(a) $\frac{1}{7}$ (b) $\frac{2}{7}$

(c) $\frac{3}{7}$ (d) $\frac{4}{7}$

27. The probability for a randomly chosen month to have its 10^{th} day as Sunday, is

(a) $\frac{1}{84}$ (b) $\frac{10}{12}$

(c) $\frac{10}{84}$ (d) $\frac{1}{7}$

28. If the mean of numbers 27+x, 31+x, 89+x,107+x,156+x is 82, then the mean of 130+x,126+x,68+x,50+x,1+x is

(a) 79 (b) 157

(c) 82 (d) 75

29. if « is the mean distributionof $\{Y_i, f_i\}$, then $\sum f_i(y_i - «)$ is equal to

(a) MD (b) SD

(c) 0 (d) relative frequency

30. Two cards are drawn successively with replacement from a well-shuffled pack of 52 cards. The probability of drawing two aces is

(a) $\frac{1}{13}$ (b) $\frac{1}{13} \times \frac{1}{17}$

(c) $\frac{1}{52} \times \frac{1}{51}$ (d) $\frac{1}{13} \times \frac{1}{13}$

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31. If $\sec\left(\frac{x+y}{x-y}\right)$ = a, then $\frac{dy}{dx}$ is

(a) $\frac{x}{y}$ (b) $\frac{y}{x}$

(c) y (d) x

32. If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is equal to

(a) $\frac{\log x}{1+\log x}$ (b) $\frac{\log x}{1-\log x}$

(c) $\frac{\log x}{(1+\log x)^2}$ (d) $\frac{y\log x}{x\,(1+\log x)}$

33. For y = cos(m $\sin^{-1}$ x) which of the following is true?

(a) $(1-x^2)\,y_2 + xy_1 - m^2y = 0$

(b) $(1-x^2)\,y_2 - xy_1 + m^2y = 0$

(c) $(1+x^2)\,y_2 + xy_1 - m^2y = 0$

(d) $(1-x^2)\,y_2 + xy_1 + m^2y = 0$

34. If f(x) = $\begin{cases} x+1 & x \le 1 \\ 3-ax^2 & x > 1 \end{cases}$ is continuous at x =1, then the value of a is

(a) -1 (b) 2

(c) -3 (d) 1

35. $\lim_{x\to\frac{\pi}{2}} \frac{a^{\cot x} - a^{\cos x}}{\cot x - \cos x}$ is equal to

(a) log a (b) log 2

(c) a (d) log x

36. If f ' '(0) = k, then $\lim_{x\to 0} \frac{2f(x)-3f(2x)+f(4x)}{x^2}$ is equal to

(a) k (b) 2k (c) 3k (d) 4k

37. If g is the inversefunction of f and f' (x) = $\frac{1}{1+x^n}$, then g'(x) is equal to

(a) $1+(g(x))^n$ (b) 1-g(x)

(c) 1+g(x) (d) $1-(g(x))^n$

38. The curves $4x^2+9y^2 = 72$ and $x^2-y^2 = 5$ at (3,2)

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(a) touch each other (b) cut orthogonally

(c) interest at 45^0 (d) interest at 60^0

39. The velocity ¬ m/s of a particle is proportional to the cube of the time. If the velocity after 2 s is 4m/s, then ¬ is equal to

(a) t^3 (b) $\frac{t^3}{2}$

(c) $\frac{t^3}{3}$ (d) $\frac{t^3}{4}$

40. The minimum value of x log x is equal to

(a) e (b) $\frac{1}{e}$

(c) $-\frac{1}{e}$ (d) $\frac{2}{e}$

41. A particle moves along the x-axis so that its position is given $x = 2t^3 - 3t^2$ at a time t second. What is the time interval during which particle will be on the negative half of the axis?

(a) $0<t<\frac{2}{3}$ (b) $0<t<1$

(c) $0<t<\frac{3}{2}$ (d) $\frac{1}{2}<t<1$

42. A stone thrown vertically upwards satisfies the equations $s = 80t - 16t^2$. The time required to reach the maximum height is

(a) 2 s (b) 4 s

(c) 3 s (d) 2.5 s

43. If f(x+y) = f(x), f(y), f(3) = 3, f'(0) = 11. Then f'(3) is equal to

(a) $11.e^{33}$ (b) 33

(c) 11 (d) log 33

44. If y = x tan y, then $\frac{dy}{dx}$ is equal to

(a) $\frac{\tan y}{x-x^2-y^2}$ (b) $\frac{y}{x-x^2-y^2}$

(c) $\frac{\tan y}{y-x}$ (d) $\frac{\tan x}{x-y^2}$

45. The product of the lengths of subtangent and subnormal at any point (x,y)) of a curve is

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(a) x^2 (b) y^2

(c) a constant (d) x

46. The equation of tangent to the curve

$$\left(\frac{x}{a}\right)^n + \left(\frac{y}{b}\right)^n = 2 \text{ at(a,b) is}$$

(a) $\frac{x}{a} + \frac{y}{b} = 2$ (b) $\frac{x}{a} + \frac{y}{b} = \frac{1}{2}$

(c) $\frac{x}{b} - \frac{y}{a} = 2$ (d) ax + by = 2

47. If $\int_0^{\infty} \frac{x^2 dx}{(x^2+a^2)(x^2+b^2)(x^2+c^2)} = \frac{\pi}{2(a+b)(b+c)(c+a)}$, then the value of $\int_0^{\infty} \frac{1}{(x^2+4)(x^2+9)} dx$ is

(a) $\frac{\pi}{60}$ (b) $\frac{\pi}{20}$ (c) $\frac{\pi}{40}$ (d) $\frac{\pi}{80}$

48. $\int (e^{a \log x} + e^{x \log a}) dx$ is equal to

(a) $\frac{x^{a+1}}{a+1} + c$ (b) $\frac{x^{a+1}}{a+1} + \frac{a^x}{\log a} + c$

(c) $x^{a+1} + a^x + c$ (d) $\frac{x^{a+1}}{a-1} + \frac{\log a}{a^x} + c$

49. $\int_0^a \frac{dx}{x+\sqrt{a^2-x^2}}$ is

(a) $\frac{a^2}{4}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) ®

50. If $\int_{-1}^{4} f(x)dx = 4$ and $\int_{2}^{4} [3 - f(x)dx = 7$, then the value of $\int_{-1}^{2} f(x)dx$ is

(a) -2 (b) 3 (c) 5 (d) 8

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